

CLAIMS

We claim:

1. A thin film transistor, comprising:
 - a substrate;
 - a gate electrode disposed in the substrate;
 - a gate insulation layer disposed on the substrate and gate electrode;
 - a channel layer disposed on the gate insulation layer;
 - a source ohmic contact layer and a drain ohmic contact layer arranged on the channel layer and at the end of the channel layer;
 - a source electrode disposed on the substrate and source ohmic contact layer;
 - a drain electrode disposed on the substrate and drain ohmic contact layer.
2. The thin film transistor of claim 1, wherein the surface of the gate electrode is parallel with the surface of the substrate.
3. The thin film transistor of claim 1, wherein the gate electrode is made of metal material.
4. The thin film transistor of claim 3, wherein the gate electrode adopts Cu, Al, Ti, Mo, Cr, Ta, Nd or its alloy.
5. The thin film transistor of claim 1, wherein the cross-section of the gate electrode is trapezoid.
6. The thin film transistor of claim 1, wherein the cross-section of the gate electrode is rectangle.
7. The thin film transistor of claim 1, wherein the substrate is made of one of glass, silicon oxide .
8. The thin film transistor of claim 1, wherein the gate insulation layer is made of

one of silicon nitride, silicon oxide.

9. The thin film transistor of claim 1, wherein the channel layer is made of one of amorphous silicon, polycrystalline silicon.

10. The thin film transistor of claim 9, wherein the source and drain ohmic layers are formed by doping the channel layer.

11. A display device including a plurality of thin film transistor used to control and drive display material, wherein the thin film transistor comprising:

- a substrate;

- a gate electrode disposed in the substrate;

- a gate insulation layer disposed on the substrate and gate electrode;

- a channel layer disposed on the gate insulation layer;

- a source ohmic contact layer and a drain ohmic contact layer arranged on the two sides of the channel layer;

- a source electrode disposed on the substrate and source ohmic contact layer;

- a drain electrode disposed on the substrate and drain ohmic contact layer.

12. The display device of claim 11, wherein the display material is liquid crystal.

13. A method for producing a thin film transistor comprising the steps of:

- forming a gate electrode in a substrate by a photo mask process;

- forming a gate insulation layer, amorphous silicon layer, phosphor doped amorphous silicon layer;

- wiping off two sides of the amorphous silicon layer and phosphor doped amorphous silicon layer;

- forming source and drain metal layers;

- wiping off the center area of the metal layers;

wiping off the center area of the amorphous silicon layer to form a source ohmic contact layer, a drain ohmic contact layer and a channel layer.

14. The method for producing a thin film transistor of claim 13, wherein the method of forming the gate insulation layer, the amorphous silicon layer and the phosphor doped amorphous silicon layer is deposit.

15. The method for producing a thin film transistor of claim 13, wherein the method of wiping off the amorphous silicon layer and doping phosphor amorphous silicon layer is photo mask and etching.

16. The method for producing a thin film transistor of claim 13, wherein the method of forming the source and drain metal layer is deposit.

17. The method for producing a thin film transistor of claim 13, wherein the methods of wiping off the center area of the source and drain metal layer are photo mask and etching.

18. The method for producing a thin film transistor of claim 13, wherein the methods of wiping off the center area of the amorphous silicon layer and forming a source ohmic contact layer, a drain ohmic contact layer and a channel layer are dry etching.

19. The method for producing a thin film transistor of claim 13, wherein the once photo mask procedure of forming the gate electrode comprising the steps of:

forming a photo blocking film on the substrate;

forming a pattern of the gate electrode;

forming a channel on the substrate;

depositing metal in the channel;

forming the gate electrode.

20. The method for producing a thin film transistor of claim 19, wherein the method of forming the photo blocking film is covering and baking.

21. A thin film comprising:

a substrate defining a cavity in an upper face;

a gate electrode filled in said cavity;

a gate insulation layer applied upon said substrate covering both said substrate and said gate electrode;

a channel layer applied upon said gate insulation layer and only covering a central portion of an upper face of said gate insulation layer;

a source electrode disposed upon one side of said channel layer and further covering a portion of said gate insulation layer wherein said portion is exposed to an exterior before said source electrode is applied thereto; and

a drain electrode disposed upon the other side of the channel layer and further covering another portion of said gate insulation layer wherein said another portion is exposed to the exterior before said drain electrode is applied thereto.